Pg. 66 2.1 Thursday, October 6

1. Average Speed $= \frac{\Delta y}{\Delta t} = \frac{16(3)^2 - 16(0)^2}{3-0} = \frac{144}{3}\frac{ft}{sec} = 48\frac{ft}{sec}$

3. Average speed $= \frac{\Delta y}{\Delta t} = \frac{16(3+h)^2 - 16(3)^2}{h}$

$$\frac{\Delta y}{\Delta t} = \frac{16(9+6h+h^2) - 16\cdot 9}{h} = \frac{144+96h+16h^2-144}{h} = \frac{96h-16h^2}{h}$$

$$\frac{\Delta y}{\Delta t} = 96-16h$$

Instantaneous speed $= \lim_{h\to 0}(96-16h) = 96\frac{ft}{sec}$

5. $\lim_{x\to c}(2x^3-3x^2+x-1) = 2c^3-3c^2+c-1$

9. $\lim_{x\to 1}(x^3+3x^2-2x-17) = (1)^3+3(1)^2-2(1)-17 = 1+3-2-17 = -15$

15. $f(x) = \frac{x^2+6x+2}{x+1}$

a.

x	-0.1	-0.01	-0.001	-0.0001
$f(x)$	1.567	1.960	1.996	2.0

b.

x	0.1	0.01	0.001	0.0001
$f(x)$	2.373	2.040	2.004	2.0004

$\lim_{x\to 0} f(x) = 2$

23. $\lim_{x\to 0}\frac{|x|}{x}$ you cannot substitute zero into the x's because you would cause division by zero, which results in an undefined value.

$\lim_{x\to 0^-}\frac{|x|}{x} = -1$ $\lim_{x\to 0^+}\frac{|x|}{x} = 1$ since $\lim_{x\to 0^-} f(x) \neq \lim_{x\to 0^+} f(x)$, the limit of the function as x approaches 0 DNE.

25. $\lim_{x\to 1}\frac{x-1}{x^2-1} = \frac{1}{2}$ Try this: $\lim_{x\to 1}\frac{x-1}{(x-1)(x+1)} = \lim_{x\to 1}\frac{1}{x+1} = \frac{1}{2}$